

Cross Reference to Related Applications

This application is a divisional of United States Patent Application Serial No. 10/057,227, filed on January 25, 2002, entitled Electrosurgery with Improved Control Apparatus and Method.

In the Claims

1. (Canceled).
2. (Canceled).
3. (Canceled).
4. (Canceled).
5. (Canceled).
6. (Canceled).
7. (Canceled).
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12. (Canceled).
13. (Canceled).
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15. (Canceled).
16. (Canceled).

17.. (Canceled).

18. (Canceled).

19. (Canceled).

20. (Canceled).

21. (Canceled).

22. (Canceled).

23. (Canceled).

24. (Canceled).

25. (Canceled).

26. (Original) An electrosurgical method for performing  
electrosurgery at an operative site on a patient, comprising the steps of:

providing a source of environmental gas molecules having  
an excitation frequency;

5 moving the gas molecules from the source into proximity  
with the operative site;

providing a laser having a laser beam with a frequency equal  
to about an integer multiple of the excitation frequency of the environmental gas;

controlling the laser beam to provide power sufficient to  
10 excite the gas molecules generally along a pathway leading toward the operative  
site;

providing an electrosurgical generator having electrosurgical  
power; and

- delivering the electrosurgical power along the pathway
- 15 toward the operative site to perform the electrosurgery on the patient.

27. (Original) The electrosurgical method recited in Claim 26,  
wherein during the delivering step, includes the step of:

providing the electrosurgical energy with power sufficient to  
ionize the excited gas molecules along the pathway.

28. (Original) The electrosurgical method recited in Claim 26,  
further comprising the steps of:

insufflating the patient with a particular gas in a laparoscopic  
procedure; and

- 5 the step of providing a laser includes the step of generating  
the laser beam in a discharge laser including the particular gas.

29. (Original) The electrosurgical method recited in Claim 28,  
wherein the generating step includes the step of generating the laser beam in a  
carbon dioxide discharge laser.

30. (Original) The electrosurgical method recited in Claim 26,  
wherein the step of providing at least one laser comprises the steps of:

providing a first laser, having a first laser beam;

providing a second laser, having a second laser beam; and

5                                   converging the first laser beam and the second laser beam  
toward the operative site.

31.     (Original) The electrosurgical method recited in Claim 26,  
wherein the step of delivering the electrosurgical power includes the step of  
delivering the electrosurgical power in a monopolar configuration.

32.     (Original) The electrosurgical method recited in Claim 26,  
wherein the step of delivering the electrosurgical power includes the step of  
delivering the electrosurgical power in a bipolar configuration.

33.     (Original) The electrosurgical method recited in Claim 26,  
further comprising the step of moving the laser beam relative to the patient.

34.     (Original) The method recited in Claim 33, wherein the  
moving step includes the step of scanning the laser beam relative to the  
operative site.

35.     (Original) The electrosurgical method recited in Claim 26,  
wherein the step of energizing the laser includes the step of pulsing the laser.

36. (Original) A laparoscopic method for performing electrosurgery at an operative site in the abdomen of a patient, comprising the steps of:

- insufflating the abdomen with gas molecules having an  
5 excitation frequency;  
exciting the gas molecules with a laser beam to form a  
pathway of excited molecules leading toward the operative site, the laser beam  
having a fundamental frequency or harmonic thereof equal to about the  
excitation frequency of the insufflation gas; and  
10 delivering electrosurgical energy along the pathway of  
excited gas molecules to perform an electrosurgical operation at the operative  
site.

37. (Original) The electrosurgical method recited in Claim 36, further comprising a step of moving the laser beam relative to the patient.

38. (Original) The electrosurgical method recited in Claim 36, further comprising the step of focusing the laser beam at other than the operative site.

39. (Original) The electrosurgical method recited in Claim 37, wherein the moving step includes the step of scanning the laser beam to provide the pathway with a non-linear configuration.

40. (Original) The electrosurgical method recited in Claim 39, wherein the scanning step includes the step of scanning the laser beam to provide the pathway with a planar configuration.

41. (Original) This electrosurgical method recited in Claim 36, further comprising the step of pulsing the laser beam.

42. (Original) The electrosurgical method recited in Claim 41, further comprising the step of pulsing the electrosurgical energy.

43. (Original) An electrosurgical method for performing laparoscopic electrosurgery an operative site in the abdominal cavity of a patient, comprising the steps of:

- insufflating the abdominal cavity with an insufflation gas
- 5 having an excitation frequency;
- lasing the insufflation gas at a lasing frequency, during the lasing step, exciting the gas molecules to form a pathway of excited gas molecules leading toward the operative site;
- directing electrosurgical energy along the pathway of excited
- 10 gas molecules toward the operative site; and
- operating electrosurgically on the patient at the operative site.

44. (Original) The electrosurgical method recited in Claim 43, wherein the lasing frequency is dependent on the excitation frequency of the insufflation gas.

45. (Original) The electrosurgical method recited in Claim 44, wherein the lasing frequency is an integer multiple of the excitation frequency of the insufflation gas.

46. (Original) The electrosurgical method recited in Claim 43, further comprising the step of ionizing the excited gas molecules.

47. (Original) The electrosurgical method recited in Claim 46, wherein the lasing step includes the ionizing step.

48. (Original) The electrosurgical method recited in Claim 46, wherein the directing step includes the ionizing step occurs within the directing step.

49. (Original) The electrosurgical method recited in Claim 46, wherein the directing step includes the steps of:

providing the electrosurgery energy with first characteristics during the ionizing step and with second characteristics different than the first characteristics during the operating step.

50. (Original) A method for performing electrosurgery within a body conduit, comprising the steps of:

providing a catheter having a shaft with a proximal end and a distal end, and a balloon with a wall, the balloon being carried by the shaft generally at the distal end of the shaft;

inflating the balloon with a gas having molecules;

releasing a portion of the gas molecules from the balloon;

exciting the molecules of the inflation gas with laser energy to produce a pathway of excited gas molecules; and

introducing electrosurgical energy into the pathway to perform the electrosurgery within the body conduit.

51. (Original) The method recited in Claim 50, wherein the exciting step includes the step of providing a light fiber within the shaft of the catheter;

delivering the laser energy through the light fiber and into the gas to excite the molecules of the gas.



52. (Original) The method recited in Claim 51, wherein the delivery step includes the step of delivering the laser energy through the wall of the balloon and into the molecules of the gas.

53. (Original) The method recited in Claim 50, wherein the introducing step includes the steps of:

providing an electrosurgical electrode on the wall of the balloon; and

5 delivering the electrosurgical energy along the pathway to perform the electrosurgery within the body conduit.

54. (Original) The method recited in Claim 50, wherein:

the inflating step includes the step of inflating the balloon with an inflation gas having an excitation frequency; and

5 the exciting step includes the step of exciting the inflation gas with laser energy having a discharge frequency equal to about an integer multiple of the excitation frequency of the inflation gas.

55. (Canceled).

56. (Canceled).

57. (Canceled).

58. (Canceled).

59. (Canceled).

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60. (Canceled).

61. (Canceled).